

SIDEREAL TIMES

*The Official Publication of the
Amateur Astronomers Association of Princeton*

Director:
Kirk Alexander

Treasurer:
Ron Mittlestaedt

Program Chairman:
Mark Lopez

Assistant Director:
John Miller

Secretary:
Lisa Yeh

Editor:
Victor Belanger

Volume 31

October 2002

Number 9

From the Director

Heavenly Lights No sooner had I returned from a wonderful three-week vacation this summer when I realized that the weekend of September 7 would be a new moon. I felt a bit nervous asking the family for a night away already but as luck would have it I was able to share a day at the beach to close the summer fun and quickly stuff my car with enough equipment to head to Jenny Jump for a night of observing and (hopefully) CCD picture taking. Any of you who are new to the AAAP should take time to chat with one of the officers or other members of the club to find out more about our remote observatory up in the Jenny Jump State Park near Hope, New Jersey. Although it sits on a mountain that is only too near to Hacketstown, this spot has amazed me and given me most of the best observing thrills I have had in the Garden State. The night of September 7th was to be no exception.

I managed to get to Jenny Jump at about 7:30 having bolted from my house around 5:30 and snatched a Burger King dinner which I snarfed down during stop-light minutes on the way North. I was pleasantly surprised to find several fellow AAAP members on site and a number of other enthusiastic observers as well. There were more scopes set up that night than I think I've ever seen before. I set about putting my equipment in place and begging use of a few things that I forgot in my haste to get away. By 8:30 I was ready to roll and took a moment to relax while the darkness settled in. What happened next stopped ALL of us in our tracks. We were about to witness one of the most spectacular auroral displays I've ever experienced in New Jersey. Walt Windish of the UACNJ summed it up very nicely in his email to the UACNJ newsgroup:

WOW. What a night at Jenny. Clear, no dew, lots of 'scopes and a huge aurora (Saturday). It started around 9:10 PM and was like someone turned on the spotlights for a new mall! It totally engulfed the big dipper in color - greens and reds, you could see the forms shifting. The classic sideways "S" shape in green near the bottom and rays up to 85% above the horizon. It shut down a short while at 9:28, then at 9:35 there were a few rays up to



the zenith (90%) !! The entire big dipper was enveloped all the way to Cassiopeia. Breathtaking. There were more scopes than I've seen before up there, too. I'm guessing 25 plus people. Of course, this was the first night I was up there without a camera (actually film). To the prepared guy with the digital camera and some nice shots - don't forget to post one or two! And thanks, Ralph, for a really fine look at the veil nebula through your AP.

Above is a photograph taken the same night by Paul Ostwald who saw the same event down in Southern New Jersey at the BFSP with

(Director, continued on page 2)

Simpson Observatory (609) 737-2575

At our November 12, meeting, we will be celebrating the 40th Anniversary of the AAAP. Our club was founded in 1962 and to commemorate the event we will be having a buffet dinner for members and guests prior to the regular 8:00 PM meeting. We will also be welcoming our guest speaker, Freeman Dyson. Contact Mark Lopez for reservations. There are only 50 places available, estimated cost \$40 per.

(Director, continued from page 1)

a many others from the South Jersey Astronomy Club. I, too, wish I had managed to bring along a normal camera along with my CCD! One of our members told me that he had received an email that afternoon from the solar activity center alerting him to a possible aurora. Although he didn't believe it would amount to much he was lucky enough to see it for himself at Jenny Jump. I plan to sign up myself now! If you want to catch a few more glimpses there is a nice set of images on the Sky and Telescope web site under Aurora Delights. You can also sign up for email alerts about space weather at <http://www.sel.noaa.gov/avisories/> or <http://science.nasa.gov/news/subscribe.asp?checked=sw>. Another service is provided by Sky and Telescope at <http://skyandtelescope.com/observing/proamcollab/astroalert/default.asp>.

So it's good to be back home with my telescopes and the AAAP monthly meetings. As usual our Program Chair, Mark Lopez, is putting together a terrific set of fall lectures. It turns out that this November marks the 40th anniversary of the beginning of our club and we are currently discussing ways to celebrate. We are also contemplating a number of other group events such as another special members night of observing at Washington Crossing. So stay tuned to these pages and to our website (<http://www.princetonastronomy.org>) for continuing updates.

Kirk

Minutes of the Regular meeting of the AAAP September 10, 2002

Director Kirk Alexander called the meeting to order at 8:05 PM. There was a nice aurora display recently and Kirk requested that those who had seen it might write up a description.

Program chairman Mark Lopez introduced the evening's speaker, Mr. Bartosz Pindor, who is in his final year of his PhD work in the Department of Astrophysical Sciences at Princeton University. The title of Mr. Pindor's talk was "Gravitational Lensing: A Story about Mass and Light". The talk was well received.

Kirk opened the business meeting with a request for activity suggestions for this fall. There are 2 local star parties coming up on October 4 and a suggestion was made that we could have our own at Washington Crossing State Park (WCS). Michelle Novatsky volunteered to coordinate our star party tentatively planned for November 2 starting at around 4pm.

Michelle mentioned that the 40th anniversary of the AAAP Club was coming up in November.

Rex Parker mentioned that he, Mark Jaworsky, and Gene Ramsey had accompanied about 35 people to the Hayden Planetarium in NYC and enjoyed it. He suggested that our club could take a field trip there sometime in the winter.

Ron Mittelstaedt reported that a new 25-year lease has been signed at WCS for \$1/year. Some discussion followed about liability and insurance issues.

Next AAAP Board Meeting was set for Thursday, October 10 at 7:30pm at Kirk's new office.

Treasurer Ron Mittelstaedt reported our current balance is \$8,439.11 and we have 124 members.

Program Chair Mark Lopez gave a preview of the speakers coming

up during the year. Details available on the web site.

Observatory Chair Rex Parker reported that the observatory was well organized and looks great thanks to efforts from Asst. Observatory Chair Gene Ramsey and Past Director John Church. There has been an outstanding improvement over the summer due to a lot of work from Gene and John including getting a refractor in operation, painting, some masonry, and grounds maintenance.

Rex mentioned that the October public night series would begin the last Friday in September and extend for 6 weeks into the first Friday in November. Keyholder Training Sessions are planned for this fall and details will be finalized at the October board meeting. Rex requested that current keyholders volunteer if able to assist. A work party to winterize the observatory is planned at the end of the season.

Larry Smith suggested that holding a star party at Jenny Jump may be an effective way to get more people to go up there. Ron said we already had one party up there this year.

Sidereal Times Editor Vic Belanger requested submissions for the next issue be made by September 18. He also mentioned that his introductory course to astronomy would be held beginning on September 21 at WCS and continuing on October 4, 11, 18, and 25.

John Miller, Webmaster, mentioned that Sidereal Times will now be available from the website in .pdf format.

The meeting was adjourned at 10:02 PM.

Lisa I. Yeh, Secretary

From the Treasurer:

The treasury balance is \$8439.11 and 125 members.

Note: Michele, our publisher, will continue putting the dues renewal date on the upper right corner of each Sidereal Times address label. This is the date that your renewal membership is due with the AAAP. Those with club magazine subscriptions to Astronomy or Sky and Telescope or both would want their subscriptions renewed about three months prior to the date of your club renewal. Please act accordingly, for if you wait until your club dues are due to pay for your magazine subscription you may miss one or two issues.

I am not going to send out renewal notices to members who get magazines; they get enough notices from their respective publishers. If I don't receive your renewal on the date indicated on your address label you will be dropped from the roster. If you are a keyholder, the respective observatory chairmen will be notified and you will be asked to return the key.

The dues structure is as follows:

\$30 basic membership.

\$60 for membership and subscription to Astronomy or Sky and Telescope magazine.

\$90 if both magazines are desired with membership.

If you have a Sky and Tel subscription please send the subscription notice and the postage paid envelope when renewing your membership.

You may send the dues directly to me at: Ron Mittelstaedt, Treasurer, 149 Palmer Lane, Ewing, NJ 08618-3207

Ron Mittelstaedt

A Rose and a Witch's Brew

or

A day and a night in the life of an itinerant observer...

By: Mark Jaworsky

During September's new moon dark cycle, I finally had the opportunity to observe at the S*T*A*R Astronomy Club's dark sky observing site, deep in the heart of the Pine Barrens. Because of the site's remoteness from civilization and its apparent similar scenery to the recent "horror" movies of the same name, S*T*A*R's Dan Pontone gave the site the sobriquet Blair Witch II. The night I was there turned out to be a fantastic night of observing and meeting new friends even if my Alzheimer's prevents me from remembering everyone's name. To Greg Cantrell and S*T*A*R, thanks for the gracious invite and thanks for arranging for the special sky show. What can I say except WOW!

However before I journeyed into the heart of desolation, I traveled to the heart of civilization. Namely I participated as an astro-guide and interpreter for the Hopewell Township sponsored trip to the Frederick Phineas and Sandra Priest Rose Center for Earth and Space at the American Museum of Natural History in New York City. The other AAAP members who participated were Rex Parker (organizer of the AAAP effort), Gene Ramsey, Larry Smith and Rich Armington.

About 30 Hopewell Township residents departed for New York on Saturday morning September 7th, 2002. During the bus ride, Rex gave a brief overview of what we could expect at the center and then threw the aisle open to the rest of us. All of us brought various materials for the participants to peruse (books, magazines, astronomical drawings, AAAP and UACNJ brochures) which were passed around the bus. In addition, Gene and I had brought specimens of meteors that we own. We walked up and down the aisle answering questions from all the residents.

After arrival at the Rose Center, the township trip organizer, Michael Hritz, was able to secure tickets for the next space show in the New Hayden Planetarium in the top of the 87-foot sphere that is the centerpiece of the Rose Center. The show narrated by Harrison Ford is called, "The Search for Life: Are We Alone?"

The show attempts to answer the age-old question. Does life exist anywhere else in the universe? Ancient mythologies and contemporary science fiction have presented imaginative possibilities, but how does modern science approach this question? The audience embarks on a journey from the depths of Earth's oceans, to the surface of Mars and then to under Europa's icy crust to stellar nurseries and exoplanets discussing the potentialities of life in each of these environments.

After the show we exited onto the Scales of the Universe display which attempts to model all of existence – from the enormous expanse of our observable universe to the smallest subatomic particles — by using the 87-foot Hayden Sphere as a basis for comparison to various walkway rail mounted models. This display followed the powers of ten from 10^{26} meters to 10^{-21} meters. Some examples shown were if the Hayden Sphere represented the size of the observable universe then a spheroid roughly the size of a beach ball represented the all of the galactic superstructure that has been mapped. If the Hayden Sphere represented this mapped superstructure then another basketball-sized spheroid represented

the local super cluster. If the Hayden Sphere represented the local super cluster then a walkway-mounted disk represented the Milky Way galaxy and two adjoining disks represented the largest spirals of the local group of galaxies, M31 and M33.

And on down it went through the various powers of ten, briefly stopping at the solar system – if the Hayden Sphere represented the sun then a ten-inch ball was the Earth with three other balls representing the terrestrial planets. Mounted next to the sphere were a realistically rendered 9-foot model of Jupiter and a model Saturn with 17-foot rings along with smaller models representing Uranus and Neptune. However noticeably missing was Pluto from this display.

But the model didn't stop here. It continued on into the microscopic domain. If the Sphere is the size of a raindrop, then a rail-mounted model is the relative size of a red blood cell. If the Sphere is the size of a red blood cell, then a model is the relative size of a rhinovirus. If the Sphere is the size of a rhinovirus, then a model is the relative size of a hydrogen atom. All in all it was a very effective demonstration of everything.

The Scales of the Universe ended at the entrance of the Big Bang Theater in the lower part of the Hayden Sphere. A computer animated simulation of the big bang and subsequent evolution of the universe was dramatized here. After the presentation you were invited to journey down the Cosmic Pathway, a gently sloping 360-foot walkway, which winds one and one-half times around the Hayden Sphere. This is another scale model but instead of size this models 13 billion years of cosmic evolution. An average human stride covers 75 million years in the course of cosmic evolution. Walking down the Pathway, you pass by a photographic record of cosmic history: astronomical images as they appeared at that time of the universe corresponding to that place on the Pathway. Also included were various specimens from the solar systems life span, diamond dust from before the solar system was formed; a meteorite that dates from the birth of our solar system; samples of the oldest rock formation on Earth; stromatolites; trilobites; and the fossilized serrated tooth of a giant carnivorous dinosaur. The Cosmic Pathway concludes with the Age of Dinosaurs, which became extinct 65 million years ago — less than two feet from the end of the Pathway, and the duration of recorded human history, portrayed as the thickness of a human hair.

The Cosmic Pathway emptied onto Hall of the Universe an exhibit that illuminates the discoveries of modern astrophysics. The hall examines such questions as how the universe evolved into, galaxies, stars and planets and how the atoms from which we are made were created in the hearts of stars. The centerpiece is the 15-ton Willamette Meteorite.

At this point the tour group broke up to explore the Center and the Museum of Natural History on our own. After lunch I went with Gene and Larry to the Hall of Meteorites to see the famed Cape York Meteor a 34-ton chunk of iron recovered in Greenland. After touring the Hall we returned to the Willamette meteor to meet

(Rose, continued on page 4)

(Rose, continued from page 3)

David Zurek a staff Astrophysicist who told us about his work in the Hayden and research into globular clusters.

Soon it was time to depart and we boarded the bus for the return trip home. Much too short a time to fully explore and appreciate the Rose Center but adequate to whet the appetite for a future return.

We arrived back in Hopewell at about 4:45 PM. Since I already had my telescope packed in my truck and was armed with directions I headed straight down to the BWII observing site so I could find my way to the site in the light. Blundering about the Pine Barrens on totally unfamiliar tracks in the middle of the night was not overly appealing to me. From the directions from the S*T*A*R web page, it appeared that the Blair Witch II site is approximately 30 miles south of Allentown, NJ. Overall the directions were pretty good except the road in from 539 doesn't turn as claimed but you take the right after 1.6 miles. I know that now so the next time I won't go straight again until it does turn. Luckily it was light and easy to correct the minor blunder. On the road in from 539 I passed multitudes of deer, which were smart enough not to run into my path.

Anyway I arrived a bit after six after stopping at the New Egypt WAWA on the corner of Routes 528 and 539 to fill my thermos full of coffee and grab a sandwich and water for dinner. Blair Witch II turned out to be a small clearing in the woods roughly half the size of a football field at the intersection of two dirt tracks. I then began to set up. After I set up my scope and gear and started to enjoy my sandwich, S*T*A*Rs Fred Block rolls up with his 20" Obsession followed a bit later by Charles Kirby and his 4.7" Astrophysics. Right about sunset or we were joined by a few ASTRA folks (Paul Gitto his son Anthony (?) and some other gentleman whose name escapes me) followed by S*T*AR's Greg Cantrell and John Heidema.

Now it was time to do some observing. I could tell this was going to be a great night and a very dark site since the Milky Way was easily distinguishable in the twilight. Its appearance at this point rivaled the best views of it in the deep of night from my home. The first object that I saw in the bright twilight was the open cluster M11. After it got a little darker I started visiting a Scorpius to view the southern Messiers under dark sky conditions. By this time the Milky Way was "blazing" from the Cygnus Rift overhead through the "steam" from the spout of Sagittarius' teapot. I was observing the globular cluster M4 when Fred calls me over to look at the globular M22 in his 20" scope. I saunter over put my eye to the eyepiece and the next thing I know I hear the sound of my jaw dropping to the sand below. As Fred put it, the "quote" most appropriate for this sight would have been: "My God it's full of Stars". I quickly put the same cluster in my mere 10" and the view was not as good. Where I had gaps and dark lanes in my scope, Fred's view filled these with stars and they wouldn't quit right down to the core. It was one of the most amazing sights I have ever seen. Thank you Fred that is one heckuva scope.

After this I explored around Sagittarius a bit looking at the Lagoon (M8) and the Trifid (M20) Nebulae, which were easily visible without a OIII filter. The only advantage the OIII offered was that it made the Trifid's dark lanes more easily distinguishable. I then switched to some smaller globulars (NGC 6293 and NGC 6356)

in the area.

By this time I figured the skies got dark enough to go hunting for the comet C/2002 O4 Hoenig that is making an appearance at this time. I was scanning through Ursa Major trying to find the comet when all of a sudden the field of view in my eyepiece experiences a complete white out. I was a bit startled and confused when all around me erupt shouts of "HOLY COW! WILL YOU LOOK AT THAT!" (This narrative contains an editorialization of the actual expression used. The only thing that the actual expression had to do with cows is commonly used as fertilizer.) Anyway, I looked up and saw what appeared to be a search light beam in Ursa Major. In the next few minutes this display developed multiple pillars of greens and blues and sheets of red. All of us stopped what we were doing and for about the next 40 minutes just ignored our equipment and stood around and observed the display. At its peak it extended through Ursa Major to Cassiopeia from horizon to the zenith. It was totally awesome. Fred also kept me out of the doghouse by lending me his cell phone and I called home and left a message on my machine telling my wife to get outside ASAP and look north. (Fortunately Cindy arrived home about 10 minutes later and was able to catch the tail end of the display from Hopewell in Northern Mercer county).

(The next day ASTRA's Paul Gitto posted a message on the Star BBS with a link to an image of the auroral display. The images shown below were taken By Karl Kuehn in Greene NY using an Olympus C-700, at f/2.8, and a 16 second exposures and are

remarkably similar to what was visible to us.)



After the display ended we went back to slumming in our eyepieces. Some of the things I saw were the Veil (in Fred's and my scope), the Double-double, Alberio and the Butterfly cluster (M6) courtesy of Charles, fantastic views of NGC

891s dust lane (this is the first time I saw this as all my attempts from Washington crossing using the C-14 were unsuccessful) and a "Oh my Lord" view of M27 again courtesy of Fred.

After this I went back to my scope and found the prototypical planetary "nebula". It actually was the planet Uranus a small light greenish blue ball followed by Neptune a smaller bluer ball. Looking at Uranus you can really see



(Rose, continued on page 5)

(Rose, continued from page 4)



why Herschel named the expelled outer shells of dying stars planetary nebulae.

I then found the Helix and had the best view of NGC 253 in Sculptor

that I ever saw in my scope. It was definitely there in all its glory with evidence of dust lanes and a spiral structure with no averted imagination necessary to see it. Afterwards looked at M33 and saw hints some of the "horls" of the spiral structure as Greg said they are called. Finished off the night with the galaxies M74, NGC 7479 and NGC 7814.

Most of us started packing up at about 1:30 or so. I left with Fred and Charles at about 2 but I believe John stayed on for a bit more.

Overall it was a fantastic night and BWII is a great site. To me it seemed darker that the Jenny Jump (Starquest) area (M31 was a blazing naked eye object) but also a bit more dewy. (But I didn't have a speck of dew on my corrector plate although just about everything else was sopping wet).

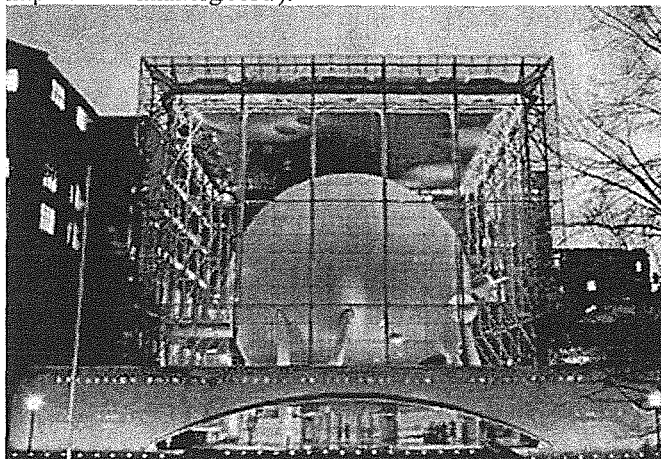
Thank you S*T*A*R for being such gracious "hosts" and it was a pleasure to meet you ASTRA folks also. I'll definitely make an effort to go back on the next cycle.

A Day at the Rose Center & Hayden in NYC...

by Rex Parker

We certainly looked and acted the part, in our black AAAP shirts and our quick responses to deep questions. Responding to a request from the director of the Hopewell Township Recreation Dept., five members of the AAAP were astro-guides and interpreters for a field trip to the Rose Center for Earth and Space/ Hayden Planetarium in NYC on Sept 7. Boarding our chartered bus along with 36 folks from the township, Mark Jaworsky, Gene Ramsey, Larry Smith, Rich Armington, and I had a motivated, if captive, audience for the surprisingly swift ride into the city (less than an hour and a half). Enroute we provided orientation and entertained the folks with discussions of astronomy, handouts and books, and of course hands-on meteorites. Once in the city, the sense of 9/11 was almost palpable. In fact, just a few days previously, Bruce Springsteen had played a spirited concert on the very steps of the Rose Center. We found the Hayden remarkably uncrowded, in fact it was the least crowded I'd ever seen in my five trips there. We had the run of the place as we took in the space show (brand new, "Are We Alone... the Search for Life in the Universe", hosted by Harrison Ford, replacing the previous show with Tom Hanks). Afterwards the AAAP gang really shined, interpreting the Scales of the Universe and the Cosmic Pathway. I believe that the township folks actually understood red shift and quasars as we strolled among the exhibits.

The Rose Center for Earth and Space at the American Museum of Natural History. The Hayden Planetarium sphere is inside. (see <http://www.amnh.org/rose/>).



Some AAAP members might recall Hayden Director Neil Tyson coming to speak to us at a club meeting a few years ago, about the design and plans for the new Hayden, a planetarium for the 21st century. Though it was controversial, in my opinion they have succeeded immensely. AAAP members who haven't experienced the new Hayden and Rose Center are urged to get this on their calendars—you will be amazed and impressed.

From the WC Observatory Chair...

The AAAP Washington Crossing Observatory has never looked better nor been at a higher level of functioning than it stands today. I'd like to reiterate thanks to Gene Ramsey and John Church who spearheaded significant upgrades and maintenance improvements at the observatory over the summer. The hard work and energy they put into the physical structure, including repairs to the concrete pedestals and the iron track for the roll-off roof, and also finishing the refractor upgrade, put us in great shape to continue our mission of cutting-edge amateur astronomical observing. And beyond the observatory itself, the new, manicured lawn adjacent to the observatory gives us a beautiful green, level place to set up member scopes for nights of observing. No more tripping in the dark over those stumps!

Stay tuned to the AAAP website and other articles in the Sidereal Times for announcements about upcoming member events at the observatory.

-- Rex

Deadline
for the
November Issue of
Sidereal Times
October 25, 2002

From The Program Chairman

October Program This month, the AAAP has something very special for all you lovers of radio astronomy. Dr. David Nice, of Princeton University's Department of Physics, will be speaking to us about his work with the 100-meter Green Bank Telescope. The Green Bank Telescope, which is located at the National Radio Observatory's site in Green Bank, West Virginia, is the world's largest fully steerable radio telescope. The GBT is described as a 100-meter telescope, but the actual dimensions of the surface are 100 by 110 meters. The overall structure of the GBT is a wheel-and-track design that allows the telescope to view the entire sky above 5 degrees elevation. The track, 64 m (210 ft) in diameter, is level to within a few thousandths of an inch in order to provide precise pointing of the structure while bearing 7300 metric tons (16,000,000 pounds) of moving weight. (GBT Website)

Dr. Nice earned his PhD in Physics from Princeton University under the direction of Dr. Joseph Taylor. He did his postdoctoral work at the National Radio Astronomy Observatory and he taught briefly at the University of Virginia. Presently, he is an Associate Professor of Physics at Princeton University and he is also a member of the Princeton University Pulsar Group <http://pulsar.princeton.edu>. To explain more about Dr. Nice's research and his work with the Green Bank Telescope, I took the liberty of reprinting the following four paragraphs from the Physics Department website.

Dr. Nice's research centers around pulsars - rapidly rotating neutron stars produced in supernova explosions. A pulsar emits beams of radiation in fixed directions relative to its surface. As it rotates, this radiation beam sweeps through the sky, and can be detected by a distant observer as a series of pulses. The fastest pulsars rotate hundreds of times a second, yielding a precisely timed train of pulses, which can be used to study the pulsars themselves, or the interstellar medium between the pulsars and us. Dr. Nice uses gigantic radio telescopes at Arecibo, Puerto Rico, and Green Bank, West Virginia, to study these stars, both to search for new ones, and study old ones.

Dr. Nice is particularly interested in pulsars in binary systems, whose orbits can be mapped out by analyzing pulse arrival times at radio telescopes. In Newtonian physics, the shapes and orientations of binary orbits remain constant over time; by contrast, general relativity makes specific predictions about how they change over time. In tight pulsar binaries, this produces measurable effects. Recently, Dr. Nice and his colleagues have used relativity to measure the mass of one binary system, and have used another system to test relativity theory itself.

Another class of binary pulsar that Dr. Nice has been studying consists of systems in which the pulsar is eclipsed by a light orbital companion (less than 0.1 solar mass); these systems may evolve to form isolated pulsars, or pulsars with planetary systems. The orbital companions are seen to lose mass, and produce irregularities in the orbit and in pulsar rotation. By studying these irregularities, Dr. Nice hopes to understand the eventual fate of these systems.

Finally, Dr. Nice is also interested in understanding the rotational stability of pulsars. Pulsar motion occasionally shows "glitches," rapid transfers of angular momentum from core to crust. On top of this, they show small, long-term irregularities. With his students,

he is collecting and analyzing long-term rotation data on several dozen pulsars.

I copied these paragraphs because as I read them I knew that I could not describe Dr. Nice's work any better than what was on the website. If you would like to know more about the Green Bank Telescope and Dr. Nice's work you can check out their websites respectively at <http://www.gb.nrao.edu/GBT/> and <http://pulsar.princeton.edu/~david/>. As I have said before, if you want to make this a really special evening, come on out and join us for dinner with the guest speaker. As usual, we will be dining at the Annex Restaurant, 128 1/2 Nassau St. at 6:00 PM on the night of the meeting. If you would like to attend, you can contact me by email at _____ or you can phone me at _____. You won't be disappointed if you do.

November Program Do not miss the November meeting. Not only is it the 40th anniversary of the founding of the AAAP, it is also the night that we are going to be graced with the presence of one of the giants of cosmology and physics. Dr. Freeman Dyson, of the Institute For Advanced Study, will be speaking to us on "A New Way To Look For Life In Cold Places Far From The Sun". Don't miss it.

At the September meeting, John Church approached me and asked if I knew that the November 12th meeting fell on the fortieth anniversary of the founding of the club. As you can guess, I was ignorant of this fact. John then proceeded to ask if we could have some sort of celebration or special dinner. I said why not. We then talked it over with Kirk and the other members of the board and it was decided that we should have something at the university. Since it was short notice, we were limited to a room that holds only 50 people. Consequently, if you would like to attend, please let me know as soon as possible. As of now, 24 people have signed up for the dinner. The cost is approximately \$40.00 per person, payable in advance of the dinner. I will have more details at the meeting.

Mark Lopez



Tradition attributes the invention of the telescope to the accidental alignment of two lenses of opposite curvature and diverse focal length by a Dutch optician, Hans Lippershey, in 1608. The principle, however, may have been known to Roger Bacon in the 13th century and to the early spectacle makers of Italy. It was GALILEO GALILEI who in 1609 constructed the first refracting telescope for astronomical purposes. Using several versions, he discovered the four brightest Jovian satellites, lunar mountains, sunspots, the starry nature of the Milky Way, and the apparent elongation of Saturn (now known to be its rings).

Deep Sky Observing Hints

by Greg Mauro

Deep sky observing can be more enjoyable and successful if each session is planned. Planning with the right tools is just as important as learning to use your observing equipment in an efficient manner. Some tips on planning and improved use of your equipment are included in this article to help you bag those elusive fuzzies.

The first step in planning is to determine if the moon is up. The moon shouldn't be an absolute deterrent because bright Messier objects can still be seen with moon pollution. However, it is desirable to do most deep sky observing with a moon free sky. Moon pollution can be determined by using any calendar with full moon notations. Moon free nights occur approximately 5 days after full moon for two weeks. Just remember that the full moon rises at sunset and is up all night. Subsequent nights will see the moon rise approximately one hour later each night. Conversely, the new moon sets at sunset and sets one hour later each night. Also remember that much less light shines from the moon a few days past new as opposed to a few days past full. Of course, many more accurate and easier methods exist to forecast moon conditions. The following annual publications contain moonrise/set/phase tables or charts as well as other useful information: *Sky-Gazer's Almanac* in the centerfold of the January issue of *Sky and Telescope*; *Astronomical Calendar* by Guy Ottewell; and *Observer's Handbook* published by The Royal Astronomical Society of Canada.

The next step in the planning process is to determine which objects will be visible. A plastic, durable planisphere with stars down to magnitude 5 will indicate which constellations will be visible. The publications listed above also include either monthly or seasonal star charts. Other considerations can include limitations of the observing site such as the direction of local light pollution, trees or other obstructions. Directly overhead is usually best. There is less atmosphere to look through and light pollution effects are diminished directly overhead. Once the areas of the sky are chosen the next step is to choose specific objects. List the objects in the order they will be viewed so as to minimize jumping to and fro about the sky. Start with the most westerly objects and work your way east to take advantage of the earth's motion. Ideally each object would be observed close to its transit or highest point in the sky. Listing the following information for each object will greatly aid the operation at the telescope: constellation, type of object, visual magnitude, size and the page number of the star chart that will be used to find the object.

Which objects can be chosen? A good observing program for beginners is the Messier list, followed by the Herschel 400. All these objects can be found in an 8 inch telescope. Many other objects are within the reach of amateur telescopes small and large. See the appendix for a list of some currently published references and observer guides. Also, keep in mind the constraints of your equipment and observing site when selecting objects. Magnitude 11 galaxies will most likely not be seen with a 3 inch telescope at a light polluted location!

Now we're ready to observe. After setting up the equipment and polar alignment has taken place the number one rule is to collimate the finder(s). Every observing session should start with a check on the pointing accuracy of the finder(s). An observing session at the

most permanent of installations can become frustrating for lack of proper collimation because the finder was inadvertently bumped since its last use. The next step is to know the field of view and orientation of the finder. Field of view is calculated by dividing the apparent field of the eyepiece by the magnification. Most finders have an eyepiece with an apparent field of about 40 to 50 degrees. Therefore, an 8x50 finder with such an eyepiece would have a field of about 5 to 6 degrees. If you're not sure, look at two stars of a known distance to determine the field. A correct view (or Amici) prism is desirable on the finder as it gives the same view as the star charts. This avoids the upside and backwards view of a finder having a regular star diagonal.

With a properly aligned finder the preferred method for locating objects is star hopping. This involves finding a bright star near the object of interest. (Use of a 1 times finder with a heads up display such as a Telrad greatly assists getting the main, magnified finder centered on the bright star.) From the bright star, a star chart is used to "hop". This is done by using recognizable patterns from the charts as viewed in the finder. The more detailed the star chart, the easier the task. Charts that plot stars to at least magnitude 8 are needed for objects in sparsely populated areas of the sky. See the appendix for recommendations and suggestions for some currently published charts. At times it is difficult to determine whether you are in the right area of the sky. Knowing the field of view of your finder and the scale of your charts should help. At other times difficulty can arise due to the awkward position of the scope or finder. It can be helpful to supplement your finder with a pair of binoculars. Binoculars will give a similar field of view and are easier to manipulate.

Unless the object is very bright it will not be visible in the finder. Center the area where the object is shown on the chart in the finder's crosshairs. Now it's time to use the scope. Start with low power and know the field of view. This will help determine how big the object of a known size should look in a known field. The wider the field of view, the better. Practical limitations put the maximum at about 1 degree of field. This should be sufficient with a properly collimated finder. Provided the object is "viewable" with the equipment and environment, it should be in the eyepiece! Some dim objects may not be seen until the averted vision technique is used. Another trick is to slightly move the scope. Extended objects will often "pop" out of the background. Knowing the expected magnitude and size should help to identify the object. Different types of objects deserve different techniques. Planetary nebulae are very small and at low power often look like a fuzzy star, if you're lucky. Try looking for a fuzzy star or increase the power. For example, my 14mm, 84 degree apparent field eyepiece gives 130x and a field of view of approximately 0.6 degrees in the Simpson 12.5" scope, the planetary should be in the eyepiece field. An UHC filter at higher powers can give fantastic results on planetaries. Diffuse nebulae are usually very large and need low powers with LPR, UHC and OIII filters giving varying results depending on the particular object. Galaxies and globular clusters can be found in the low power field, increase the power to possibly see more detail. Open clusters are generally better at low power, but vary so widely that increasing power can give pleasing results. There are no hard set rules on observing once the objects are found. Experimenting with different eyepieces and filters should be tried.

(Deep Sky, continued on page 8)

(Deep Sky, continued from page 7)

Lastly, keep a log of your observations. Note what you saw, when you saw it and what equipment was used. Include a description of local sky conditions. Draw crude sketches of objects of interest. Keeping a log allows nice objects to be catalogued for future reference while sharpening observing skill in the meantime. Even the most rudimentary logbook can be looked back on to draw personal satisfaction.

APPENDIX

Observer Guides

The following guides are listed as references to be utilized in planning an observing session. This list is certainly not intended to be exhaustive, but includes publications which are commonly available and which I have found useful.

- 1) "A Guide to the Messier Objects", Holyoke, Astronomical League, 1966. Descriptions of each object are grouped by season and an all-sky chart depicting all 110 objects is included.
- 2) "The Herschel Objects", The Ancient City Astronomy Club, Astronomical League, 1992. Descriptions of each object are grouped by season.
- 3) "The Observer's Sky Atlas", Karkoschka, 1990. Lists objects of interest by area of the sky, difficulty of observing is noted. Excellent finder charts are included.
- 4) "Observing Handbook and Catalogue of Deep Sky Objects", Luginbuhl & Skiff. Lists objects by constellation with description as seen and instrument used. An excellent guide.
- 5) "The Universe from Your Backyard", Eicher, 1988. Reprints of the column *The Backyard Astronomer* from Astronomy

magazine. 690 objects are listed by constellation.

- 6) "Stars and Galaxies", Eicher, 1992. Reprints of articles from Astronomy magazine featuring observing articles on richly interesting regions of the sky.
- 7) "Galaxies", Eicher, 1992. Reprints of observing articles from the now defunct Deep Sky magazine.
- 8) "Visual Astronomy of the Deep Sky", Clark, 1990.
- 9) "Webb Society Deep Sky Observer's Handbook", Volumes 1-5, Webb Society, 1982.
- 10) "Burnham's Celestial Handbook", Volumes 1-3, Burnham, 1978

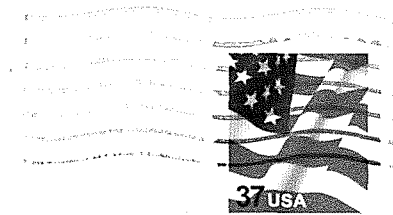
Star Charts

The following list includes the references which I use every time I observe. These references have been placed in 3 ring soft cover "Accopress" binders.

- 1) My logbook
- 2) A copy of "The Herschel Objects" descriptions
- 3) "Astro Cards", sets 1, 2, 4, 5. 100 3x5" cards per set, these are finder charts down to mag 8-9. All the Messier objects and most of the Herschel 400 are included. These have been placed in 3 ring binder photo album holders and numbered.
- 4) A copy of "Observer's Guide to the Universe", Astronomical Innovations. Thirty one laminated 8½x11" constellation charts show the location of all Messier and Herschel 400 objects also included is a tabulated list which I have annotated with the appropriate Astro Card number.

October 2002

Amateur Astronomers'
Association of Princeton
PO Box 2017
Princeton, NJ 08543



Visit us online: www.princetonastronomy.org

08330+1613 01

